

CLAIMS

1 In combination:

2 a) a first connecting assembly comprising:

4 a port having a central axis, a radially outwardly facing surface, a first free end, and a second end spaced axially from the first free end,

6 the port having threads on the radially outwardly facing surface; and

8 b) a second connecting assembly for operatively connecting a cable to the port on the first connecting assembly, the second connecting assembly comprising:

10 a tubular fitting having a central axis and axially spaced first and second ends,

12 the tubular fitting defining a receptacle for a cable at the first end of the tubular fitting,

14 the tubular fitting further comprising a threaded element with threads which can be engaged with the threads on the port to maintain the first and second connecting assemblies operatively engaged and thereby a cable in the receptacle in the tubular fitting operatively connected to the port; and

18 a sealing assembly,
20 the first and second connecting assemblies operatively engageable by i)
22 relatively situating the first and second connecting assemblies in a pre-assembly
state wherein the first and second connecting assemblies are separated from each
other; ii) relatively moving the first and second connecting assemblies from the
pre-assembly state to engage the threads on the port and threaded element; and
24 iii) rotating at least one of the port and threaded element relative to the other of the
port and threaded element to cause the threads on the port and threaded element
26 to interact and thereby cause the threaded element to move axially relative to the
port in a first direction from the first free end towards the second end of the port
28 into a secured position,
30 the sealing assembly comprising a first sealing surface that abuts to the
axially facing surface on the first connecting assembly with the threaded element
in the secured position,
32 the sealing assembly comprising a sealing portion with a second sealing
surface,
34 the sealing portion having a first state and a deformed state,
36 wherein the sealing portion is caused to be changed from the first state into
the deformed state and the second sealing surface is caused to thereby be moved

sealingly radially inwardly against the radially outwardly facing surface on the port
38 as an incident of the threaded element moving in the first axial direction with the
first sealing surface abutted to the axially facing surface of the first connecting
40 assembly,

wherein the sealing assembly and tubular fitting are maintained together as
42 a unitary assembly with the second connecting assembly separated from the first
connecting assembly.

2. The combination according to claim 1 wherein the sealing assembly
2 defines first and second axially oppositely facing shoulders, the tubular fitting
defines third and fourth axially oppositely facing shoulders, the first shoulder
4 confronts the third shoulder to confine relative movement between the sealing
assembly and tubular fitting in an axial direction towards each other and the
second shoulder confronts the fourth shoulder to confine relative movement
6 between the sealing assembly and tubular fitting in an axial direction away from
each other.
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3. The combination according to claim 1 wherein the tubular fitting
2 comprises a radially outwardly opening annular groove and the sealing assembly

4 comprises a radially inwardly projecting bead which extends into the annular

groove.

2 4. The combination according to claim 1 wherein the sealing assembly
is at the second end of the tubular fitting.

2 5. The combination according to claim 1 wherein the first and second
sealing surfaces are both spaced axially fully from the threads on the threaded
element.

2 6. The combination according to claim 4 wherein the first and second
sealing surfaces are both spaced axially fully from the threads on the threaded
element.

7. In combination:

2 a) a first connecting assembly comprising:
a port having a central axis, a radially outwardly facing surface, a first free
4 end, and a second end spaced axially from the first free end,
the port having threads on the radially outwardly facing surface; and

6 an axially facing surface; and

8 b) a second connecting assembly for operatively connecting a cable to
the port on the first connecting assembly, the second connecting assembly
comprising:

10 a tubular fitting having a central axis and axially spaced first and second
ends,

12 the tubular fitting defining a receptacle for a cable at the first end of the
tubular fitting,

14 the tubular fitting further comprising a threaded element with threads which
can be engaged with the threads on the port to maintain the first and second
16 connecting assemblies operatively engaged and thereby a cable in the receptacle
in the tubular fitting operatively connected to the port,

18 the threads on the threaded element bounding a first effective diameter;
and

20 a sealing assembly,

22 the first and second connecting assemblies operatively engageable by i)
relatively situating the first and second connecting assemblies in a pre-assembly
state wherein the first and second connecting assemblies are separated from each
24 other; ii) relatively moving the first and second connecting assemblies axially from

the pre-assembly state to engage the threads on the port and threaded element;
26 and iii) rotating at least one of the port and threaded element relative to the other
of the port and threaded element to cause the threads on the port and threaded
28 element to interact and thereby cause the threaded element to move axially
relative to the port in a first direction from the first free end towards the second end
30 of the port into a secured position,

the sealing assembly comprising a first sealing surface that abuts to the
32 axially facing surface on the first connecting assembly with the threaded element
in the secured position,

34 the sealing assembly comprising a sealing portion with a second sealing
surface,

36 the sealing portion having a first state and a deformed state,
the second sealing surface having an inside effective diameter that is
38 greater than the first effective diameter with the sealing portion in the first state,
wherein the sealing portion is caused to be changed from the first state into
40 the deformed state and the second sealing surface is caused to thereby be moved
sealingly radially inwardly against the radially outwardly facing surface on the port
42 as an incident of the threaded element moving in the first axial direction with the

44 first sealing surface abutted to the axially facing surface of the first connecting

assembly.

2 8. The combination according to claim 7 wherein the second sealing

surface has an unthreaded, continuous annular shape.

2 9. The combination according to claim 8 wherein the threads on the

port have a second effective diameter and with the sealing portion in the first state, the inside effective diameter is greater than the second effective diameter.

2 10. The combination according to claim 7 wherein the tubular fitting has

4 a first surface and the sealing assembly has a second surface and with the first sealing surface abutted to the axially facing surface of the first connecting assembly, continued movement of the threaded element in the first axial direction causes the first and second surfaces to interact to thereby change the sealing portion from the first state into the deformed state.

2 11. The combination according to claim 10 wherein at least one of the

first and second surface, as viewed in cross section in a plane extending through

the central axis of the tubular fitting, has a straight shape extending along a line
4 that is not parallel to the central axis of the tubular fitting.

12. The combination according to claim 7 wherein the threaded element
2 has a first cam surface and the sealing element has a second cam surface, and
with the first sealing surface abutted to the axially facing surface of the first
4 connecting assembly, continued movement of the threaded element in the first
axial direction causes the first and second cam surfaces to interact so as to exert
6 a radially inward force on the sealing portion as the sealing portion is changed
from the first state into the deformed state.

13. The combination according to claim 10 wherein the sealing portion
2 comprises an O-ring.

14. The combination according to claim 10 wherein the sealing assembly
2 has a third surface and with the first sealing surface abutted to the axially facing
surface of the first connecting assembly, continued movement of the threaded
4 element in the first axial direction causes the sealing portion to be compressed
between the first and third surfaces so as to expand radially inwardly to cause the

6 second sealing surface to be moved radially inwardly sealingly against the radially outwardly facing surface on the port.

2 15. The combination according to claim 14 wherein the sealing assembly comprises a wall and the first sealing surface and third surface are defined by the wall and face axially oppositely to each other.

2 16. The combination according to claim 7 wherein the first and second sealing surfaces are defined by a single piece.

2 17. The combination according to claim 7 wherein the first and second sealing surfaces are defined by first and second separate discrete elements.

2 18. The combination according to claim 7 wherein the sealing assembly and tubular fitting are maintained together as a unitary assembly with the second connecting assembly separated from the first connecting assembly.

2 19. The combination according to claim 18 wherein the sealing assembly defines first and second axially oppositely facing shoulders, the tubular fitting

defines third and fourth axially oppositely facing shoulders, the first shoulder
4 confronts the third shoulder to confine relative movement between the sealing
assembly and tubular fitting in an axial direction towards each other and the
6 second shoulder confronts the fourth shoulder to confine relative movement
between the sealing assembly and tubular fitting in an axial direction away from
8 each other.

20. The combination according to claim 7 wherein the tubular fitting
2 comprises a radially outwardly opening annular groove and the sealing assembly
comprises a radially inwardly projecting bead which extends into the annular
4 groove.

21. In combination:

2 a) a first connecting assembly comprising:
4 a port having a central axis, a radially outwardly facing surface, a first free
end, and a second end spaced axially from the first free end,
6 the port having threads on the radially outwardly facing surface; and
an axially facing surface; and

b) a second connecting assembly for operatively connecting a cable to
8 the port on the first connecting assembly, the second connecting assembly comprising:

10 a tubular fitting having a central axis and axially spaced first and second ends,

12 the tubular fitting defining a receptacle for a cable at the first end of the tubular fitting,

14 the tubular fitting further comprising a threaded element with threads which can be engaged with the threads on the port to maintain the first and second 16 connecting assemblies operatively engaged and thereby a cable in the receptacle in the tubular fitting operatively connected to the port; and

18 a sealing assembly,

the first and second connecting assemblies operatively engageable by i)
20 relatively situating the first and second connecting assemblies in a pre-assembly state wherein the first and second connecting assemblies are separated from each 22 other; ii) relatively moving the first and second connecting assemblies axially from the pre-assembly state to engage the threads on the port and threaded element; and iii) relatively rotating at least one of the port and threaded element relative to 24 the other of the port and threaded element to cause the threads on the port and

26 threaded element to interact and thereby cause the threaded element to move
axially relative to the port in a first direction from the first free end towards the
28 second end of the port into a secured position,

30 the sealing assembly comprising a sealing portion with a first sealing
surface,

32 the sealing portion having a first state and deformed state,
the tubular fitting having a first surface and the sealing assembly having a
second surface,

34 at least one of the first and second surfaces angled relative to the central
axis so that as the threaded element is moved in the first axial direction, the first
36 and second surfaces cooperate to cause the first sealing surface to be wedged
radially inwardly sealingly to against the radially outwardly facing surface on the
38 port as the sealing portion is caused to be changed from the first state into the
deformed state.

2 22. The combination according to claim 21 wherein the sealing portion
comprises an O-ring.

23. The combination according to claim 21 wherein the sealing assembly
2 comprises a second sealing surface which is abuttable to the axially facing surface
of the first connecting assembly.

24. The combination according to claim 23 wherein the first and second
2 sealing surfaces are defined by a single piece.

25. The combination according to claim 23 wherein the first and second
2 sealing surfaces are defined by first and second separate discrete elements.

26. The combination according to claim 21 wherein the sealing assembly
and tubular fitting are maintained together as a unitary assembly with the second
2 connecting assembly separated from the first connecting assembly.

27. In combination:
2 a) a first connecting assembly comprising:
a port having a central axis, a radially outwardly facing surface, a first free
4 end, and a second free end spaced axially from the first free end,
the port having threads on the radially outwardly facing surface; and

6 an axially facing surface; and

8 b) a second connecting assembly for operatively connecting a cable to
the port on the first connecting assembly, the second connecting assembly
comprising:

10 a tubular fitting having a central axis and axially spaced first and second
ends,

12 the tubular fitting defining a receptacle for a cable at the first end of the
tubular fitting,

14 the tubular fitting further comprising a threaded element with threads which
can be engaged with the threads on the port to maintain the first and second
16 connecting assemblies operatively engaged and thereby a cable in the receptacle
in the tubular fitting operatively connected to the port; and

18 a sealing assembly,

20 the first and second connecting assemblies operatively engageable by i)
relatively situating the first and second connecting assemblies in a pre-assembly
state wherein the first and second connecting assemblies are separated from each
22 other, ii) relatively moving the first and second connecting assemblies axially from
the pre-assembly state to engage the threads on the port and threaded element;
24 and iii) relatively rotating at least one of the port and threaded element relative to

the other of the port and threaded element to cause the threads on the port and
26 threaded element to interact and thereby cause the threaded element to move
axially relative to the port in a first direction from the first free end towards the
28 second end of the port into a secured position,

the sealing assembly comprising a first sealing surface that abuts to the
30 axially facing surface on the first connecting assembly with the threaded element
in the secured position,

32 the sealing assembly comprising a sealing portion with a second sealing
surface,

34 the sealing portion having a first state and a deformed state,
wherein the sealing portion is caused to be changed from the first state into
36 the deformed state and the second sealing surface is thereby caused to be moved
radially inwardly sealingly against the radially outwardly facing surface on the port
38 as an incident of the threaded element moving in the first axial direction with the
first sealing surface abutted to the axially facing surface of the first connecting
40 assembly,

42 wherein the tubular fitting has a first surface and as the threaded element
is moved in the first axial direction with the first sealing surface abutted to the
axially facing surface of the first connecting assembly, the sealing portion of the

44 sealing assembly is compressed between the first surface and the axially facing
surface of the first connecting assembly so as to expand and thereby cause the
46 second sealing surface to be moved radially inwardly sealingly against the radially
outwardly facing surface on the port.

28. The combination according to claim 27 wherein the sealing assembly
2 comprises a wall which is abuttable to the axially facing surface of the first
connecting assembly, the wall having a third surface facing oppositely to the axially
4 facing surface of the first connecting assembly, and the sealing portion of the
sealing assembly is compressed between the first and third surfaces as the
6 second sealing surface is caused to be moved radially inwardly sealingly against
the radially outwardly facing surface on the port.

29. The combination according to claim 27 wherein at least one of the
2 first and second surfaces, as viewed in cross-section in a plane extending through
the central axis of the tubular fitting, has a straight shape extending along a line
4 that is not parallel to the central axis of the tubular fitting.

30. The combination according to claim 27 wherein the sealing portion
2 comprises an O-ring.

31. The combination according to claim 27 wherein the first and second
2 sealing surfaces are defined by a single piece.

32. The combination according to claim 27 wherein the first and second
2 sealing surfaces are defined by first and second separate discrete elements.

33. The combination according to claim 27 wherein the sealing assembly
2 and tubular fitting are maintained together as a unitary assembly with the second
connecting assembly separated from the first connecting assembly.

34. In combination:
2 a) a first connecting assembly comprising:
 a port having a central axis, a radially outwardly facing surface, a first free
4 end, and a second end spaced axially from the first free end,
 the port having threads on the radially outwardly facing surface; and
6 an axially facing surface; and

b) a second connecting assembly for operatively connecting a cable to
8 the port on the first connecting assembly, the second connecting assembly comprising:

10 a tubular fitting having a central axis and axially spaced first and second ends,

12 the tubular fitting defining a receptacle for a cable at the first end of the tubular fitting,

14 the tubular fitting further comprising a threaded element with threads which can be engaged with the threads on the port to maintain the first and second connecting assemblies operatively engaged and thereby a cable in the receptacle
16 in the tubular fitting operatively connected to the port; and

18 a sealing assembly comprising a sealing portion,
there being means cooperating between the first and second connecting
20 assemblies for causing the sealing portion to be deformed radially inwardly to sealingly engage the radially outwardly facing surface on the port and the sealing
assembly to sealingly engage the axially facing surface on the first connecting
22 assembly as an incident of the threaded element and port being relatively rotated
to cause the threaded element to advance in a first axial direction from the first
24 free end of the port towards the second end of the port.

35. A method of operatively connecting a cable to a port, the method
2 comprising the steps of:

4 providing a first connecting assembly comprising: a) a port with a central
axis, a radially outwardly facing surface having threads thereon, a first free end,
and a second end spaced axially from the first free end and b) an axially facing
6 surface;

8 providing a second connecting assembly comprising a) tubular fitting with
a central axis and axially spaced first and second ends and comprising a threaded
element with threads and b) a sealing assembly having a sealing portion;

10 aligning the first and second connecting assemblies in a pre-assembly state
with the first and second connecting assemblies separated from each other;

12 relatively axially moving the first and second connecting assemblies to
engage the threads on the port and the tubular fitting;

14 rotating at least one of the port and threaded element relative to the other
of the port and threaded element to cause the threads to interact and thereby
cause the threaded element to move axially relative to the port in a first direction
16 from the first free end towards the second free end; and

18 as an incident of moving the threaded element axially in the first direction,
causing the sealing portion to be deformed radially inwardly to engage sealingly
20 with the outwardly facing surface on the port.

2 36. The method of operatively connecting a cable to a port according to
claim 35 further comprising the step of causing the sealing assembly to sealingly
engage the axially facing surface on the first connecting assembly as an incident
4 of moving the threaded element axially in the first direction.

2 37. The method of operatively connecting a cable to a port according to
claim 35 wherein the step of causing the sealing portion to be deformed radially
inwardly comprises causing the sealing portion to be changed from a) a first state
4 wherein a sealing surface is spaced from the outwardly facing surface on the port
into b) a deformed state wherein the sealing surface is pressed against the
6 outwardly facing surface on the port.

2 38. The method of operatively connecting a cable to a port according to
claim 35 wherein the step of causing the sealing portion to be deformed radially

inwardly comprises producing a compressive axial force on the sealing portion to
4 cause the sealing portion to be deformed radially inwardly.

39. The method of operatively connecting a cable to a port according to
2 claim 35 wherein the step of causing the sealing portion to be deformed radially
inwardly comprises producing an axial compressive force on the sealing portion
4 between the second connecting assembly and a part of the sealing assembly.

40. The method of operatively connecting a cable to a port according to
2 claim 35 wherein the step of providing a second connecting assembly comprises
providing a tubular fitting and sealing assembly that are maintained together as a
4 unitary assembly with the second connecting assembly separated from the first
connecting assembly.